

## 1603

URINE N-ACETYL- $\beta$ -D-GLUCOSAMINIDASE (NAG) AND  $\beta_2$ -MICRO-GLOBULINS ( $\beta_2M$ ) IN VERY LOW BIRTHWEIGHT INFANTS FED MINERAL SUPPLEMENTED FORMULA. Laura S Hillman, Sharon

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Generalized aminoaciduria and high urinary calcium/urinary creatinine (Cr) seen in infants <1500 g birthweight fed mineral supplemented formulae are not related to the higher protein content of the formula (3.0g/100Kcal) (SPR abst 1985). We thus evaluated the effects of increased calcium intake on proximal tubular function using both NAG and  $\beta_2M$  as suggested markers of proximal tubule damage. Serial urine samples from 14 infants fed a standard formula (S) (510mg/L Ca, 390mg/L P) and 21 infants fed mineral supplemented formulae (E) (950mg/L Ca, 480mg/L P) were analyzed for NAG and  $\beta_2M$  using enzymatic assays and both values corrected for Cr. Although variation was great, no difference in either mean  $\pm$  SD NAG (mmol/mg Cr) or  $\beta_2M$  (mg/L/mg Cr) was seen between infants on S or E. 3 infants on Methicillin and Gentamicin had NAG >200 mmol (>2SD) and 4 hypoproteinemic infants had both NAG <5 (<2SD) and  $\beta_2M$  <.05 (data on these 7 infants excluded from mean calculations seen in table). Though continued study is needed to define optimal mineral supplementation, these data are reassuring that the aminoaciduria seen probably represents renal immaturity or transport competition rather than tubular damage.

AGE	NAG: S(n)	E(n)	$\beta_2M$ : S(n)	E(n)
2 weeks	100 $\pm$ 38(10)	94 $\pm$ 49(10)	.25 $\pm$ .26(3)	.27 $\pm$ .19(3)
4 weeks	61 $\pm$ 40(12)	87 $\pm$ 47(11)	.27 $\pm$ .18(4)	.41 $\pm$ .23(4)
6 weeks	63 $\pm$ 39 (7)	82 $\pm$ 41 (6)	.44 $\pm$ .01(2)	.36 $\pm$ .15(3)

### †1604 THE HORMONAL BASIS OF IDIOPATHIC HYPER-CALCIURIA (IH). LEONARD C. HYMES, BARRY L. WARSHAW, (Spon. by G. Brumley): Emory Univ

School of Medicine, Dept of Ped, Atlanta. We examined 6 children with IH and their families to determine the etiology of IH. Family members were divided into 2 categories: Group 1 consisted of the 6 index cases, 5 parents with calculi and 3 siblings with unexplained hematuria; Group 2 included the remaining 15 family members without calculi or hematuria. Mean age and fasting urinary Ca (UCA mg/dL GF) were the same in Groups 1 and 2, but Group 1 had a greater calciuric response to oral Ca, higher serum Ca (mg/dL) and fasting calcitriol (pg/ml), and lower fasting parathyroid activity (cAMP: nmol/dL GF).

		Group 1	Group 2	P
UCA	fast	.12 $\pm$ .06	.12 $\pm$ .05	>.90
	post-Ca	.30 $\pm$ .06	.21 $\pm$ .08	<.005
Serum CA	fast	9.8 $\pm$ 0.5	9.3 $\pm$ 0.3	<.025
	post-Ca	10.2 $\pm$ 0.5	9.8 $\pm$ 0.2	<.005
cAMP	fast	2.5 $\pm$ 0.9	3.2 $\pm$ 1.0	<.05
	Calcitriol fast	38.4 $\pm$ 13.1	27.4 $\pm$ 11.5	<.05

Urinary Na, Mg, and P, serum P and calcidiol, and the renal phosphate threshold were similar in both groups and did not correlate with UCA. Conclusions: IH may arise from a primary disorder of Vitamin D metabolism leading to increased calcitriol synthesis and intestinal Ca absorption. The data do not support a renal phosphate leak or high Na intake as the cause of IH.

## 1605

THE EFFECTS OF ALDOSTERONE ON POTASSIUM EXCRETION IN THE DEVELOPING DOG. Yuhei Ito, David I. Goldsmith, Beth Zavilowitz, and Adrian Spitzer. Albert

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Previous reports from this laboratory have demonstrated the prominent role of aldosterone in the renal tubular transport of Na<sup>+</sup> in the newborn. The current studies concern the relationship between plasma aldosterone concentration (PAC) and the urinary excretion of K<sup>+</sup> (U<sub>K</sub>V). Mongrel puppies of either sex, 1 or 6-weeks old (n=6 in each group) were anesthetized and infused with increasing amounts of aldosterone. Measurements of PAC were done by radioimmunoassay, whereas serum and urine K<sup>+</sup> were measured by flame photometry. As expected, a direct relationship obtained between PAC, which varied between 19.1  $\pm$  2.8 and 465.0  $\pm$  37.5 ng/dl in the newborn and 5.0  $\pm$  0.3 and 317.3  $\pm$  36.1 ng/dl in the mature animals, and U<sub>K</sub>V. However, the slope of the regression line describing the behavior of the older animals (y=5.97  $\pm$  .02, r<sup>2</sup>=.83) was significantly steeper (p<.01) than the slope of the regression line depicting this relationship in newborn puppies (y=1.75  $\pm$  .0001x, r<sup>2</sup>=.42). On the other hand, there was no difference (p>.3) between the slopes of the regression lines describing the relationship between PAC and U<sub>Na</sub>V in the 1 week (y=2.00  $\pm$  .003x, r<sup>2</sup>=.65) and the 6-week-old animals (y=3.76  $\pm$  .004x, r<sup>2</sup>=.44). Thus, aldosterone affects to a larger extent Na<sup>+</sup> reabsorption than K<sup>+</sup> excretion during early life. The ensuing retention of both electrolytes should contribute to the positive external balance characteristic of growth.

## 1606

VITAMIN D AND PHOSPHATE-BINDERS ON CALCIUM AND PHOSPHATE METABOLISM IN RATS. M Jacob, F V Sheffer, G M Chu, J C M Chan. Med Coll Virginia, Richmond, VA.

In order to study and compare the effects of the different forms of commonly used vitamin D and phosphate-binders on the absorption and excretion of calcium and phosphate in the growing organism, 24 Sprague-Dawley weanling rats, weighing 44 to 62 grams, were randomly assigned to four groups: (A) control, (B) dihydroxycholesterol at 16 mcg/kg/day, (C) 1,25-dihydroxyvitamin-D at 16 ng/kg/day and (D) vitamin D at 2000 IU/kg/day. The vitamin D or metabolites were fed by stomach tube daily. To duplicate the usual circumstances in the use of vitamin D and metabolites, aluminum hydroxide at 50 to 60 mg/kg/day in the feed, was provided to all groups except the control group. Twenty-four-hour urine and feces collections were obtained each day during the last three days of the 10-day balance studies.

Significant differences in serum calcium and phosphorus concentrations were not demonstrated. The means (SEM) of the excretions of calcium (U<sub>Ca</sub>) and phosphate (U<sub>P</sub>) in mg/kg/day were:

Group	A	B	C	D
U <sub>Ca</sub>	0.28 (0.06)	0.39 (0.06)	0.18 (0.03)	0.34 (0.05)
U <sub>P</sub>	13.27 (2.35)	16.20 (2.10)	18.75 (3.46)	14.55 (4.16)

Thus, the highest excretion of calcium occurred in the dihydroxycholesterol group; the lowest occurred in the 1,25-dihydroxyvitamin D-treated group which was less than one-half that of the dihydroxycholesterol group. Phosphate excretions showed no differences between the groups.

We conclude that with therapeutic doses of vitamin-D metabolites, hypercalcaemia was not observed. Urinary calcium excretions were increased above that of control, except that of 1,25-dihydroxyvitamin D, which was lower.

## 1607

URINARY PROTEIN EXCRETION IN EARLY INFANCY. Valerie Johnson, Aruna Bakhru, Cynthia Simmons, Anasuya

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Total protein excretion rates (PER) and urinary protein patterns have been studied in 67 newborns with gestational age (GA) ranging from 25 to 40 weeks. Timed sequential urine collections were obtained from infants up to two months of age. In infants <31 weeks GA PER's fell from 15.8 $\pm$ 13.3  $\mu$ g/min (n=31) at <3 days of age to 8.9 $\pm$ 7.1  $\mu$ g/min (n=33; p<0.01) at >1 week of age. Similarly, in infants >38 weeks GA PER's fell from 43.6 $\pm$ 28.0  $\mu$ g/min (n=7) at <3 days of age to 17.3 $\pm$ 7.9  $\mu$ g/min (n=6; p<0.01) at >1 week of age. A significant positive correlation of GA to the PER was noted on Day 1 (r<sup>2</sup>=0.75; p<0.05), Day 2 (r<sup>2</sup>=0.51; p<0.05) and at >1 week (r<sup>2</sup>=0.45; p<0.05). Infants >38 weeks GA had significantly higher PER's as compared to infants of comparable post-natal age, but lesser GA. The pattern of urinary protein excretion was evaluated by SDS polyacrylamide gel electrophoresis. Results of this evaluation indicate qualitative as well as quantitative differences in protein excretion by the newborn at various GA's and post-natal ages. In particular certain low MW fractions are found in urines at an early post-natal age which are not found in the urine of the same infants at a later age. These data suggest that proteinuria of the early newborn period may be in part consequent to decreased proximal tubular reabsorption of low molecular weight proteins.

## 1608

URINARY TRACT INFECTIONS (UTI) IN CHILDHOOD: A RANDOMIZED TRIAL OF SHORT-TERM VS. CONVENTIONAL

THERAPY. Valerie Johnson, Aliya Khan, Armisa Tongson, Aditya Kaul, Donald Gromisch. (Spon. by Lawrence R. Shapiro) New York Medical College, Department of Pediatrics, Bronx, New York.

Children, aged 7 mos. to 19 yrs. with culture-proven, acute, uncomplicated lower UTI, were randomized to receive Amoxicillin as either single dose (40 mg/kg; max. 500 mg/dose) four day (40 mg/kg/day; max.500 mg/dose) or ten day (40 mg/kg/day; max.500mg/dose) therapy. Twenty-eight patients completed the study. Urine cultures were performed X2 on entrance to the study. Follow-up cultures were taken approx. 48 hrs. after initiation of therapy and 3-5 days after completion of therapy. Sedimentation rate (ESR) and C-reactive protein (CRP) were obtained prior to therapy. Pre-therapy organisms were E. coli in 63%, 100% and 85% respectively of the single dose, four day and ten day therapy groups. The 11 patients treated with single-dose therapy and 10 patients treated for four days had cure rates (55% and 70% respectively), that did not differ significantly from cure rates in the 7 patients receiving ten day therapy (71%) or from each other when three way analysis is applied to the cure rates. Relapse rates (45% and 30%) and induction of resistant organisms (9% and 0%) in the single-dose and four day therapy groups did not differ significantly from that of the ten day group. ESR (24  $\pm$  4 mm/hr, n=23) and CRP (0.81 $\pm$ 0.08 mg/dl, n=27) did not correlate with treatment outcome. The results of this study suggest that short-term antibiotic therapy of uncomplicated lower UTI's in children is effective.